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An analysis of departure behaviors of high-quality career designated first-term Marine officers

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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

AN ANALYSIS OF DEPARTURE BEHAVIORS OF HIGH-QUALITY CAREER DESIGNATED FIRST-TERM MARINE OFFICERS

by

Jonathan C. Scarfe

March 2016

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This research examines factors significant to the departure of high-quality junior Marine officers, and compares measures of performance of the officers who continue service. The top five percent of graduates from The Basic School (TBS) receive meritorious designation, while the remainder of the population competes on the Officer Retention Board (ORB) near the end of their first term. We show that TBS performance directly relates to officer performance over his/her initial obligation and subsequent selection by the ORB. Utilizing a probit model and a data set of 3,917 Marine officers, we provide statistical evidence that the source of career designation is not significant to an officer's decision to exit the Marine Corps. However, very high quality officers who are on the margin of meritorious designation have the highest probability of exiting service when compared to their peers. We recommend expanding the meritorious designation program to the top 10 percent of TBS graduates to assist in capturing high-quality junior officers.

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AN ANALYSIS OF DEPARTURE BEHAVIORS OF HIGH-QUALITY CAREER DESIGNATED FIRST-TERM MARINE OFFICERS

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Submitted in partial fulfillment of the
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LIST OF ACRONYMS AND ABBREVIATIONS

AA	Administrative Action
ASVAB	Armed Services Vocational Aptitude Battery
AVF	All Volunteer Force
CD	Career Designation
CFT	Combat Fitness Test
EAS	End of Active Service
ECP	Enlisted Commissioning Program
EDIPI	Electronic Data Interchange Personal Identifier
FY	Fiscal Year
GCT	General Classification Test
GPA	Grade Point Average
MARADMIN	Marine Administrative Message
MBS	Master Brief Sheet
MCD	Meritorious Career Designation
MCO	Marine Corps Order
MCP	Meritorious Commissioning Program
MCTIMS	Marine Corps Training Information Management System
MECEP	Marine Corps Enlisted Commissioning Educational Program
MOS	Military Occupational Specialty
NROTC	Naval Reserve Officer Training Corps
OCC	Officer Candidates Course
OMPF	Official Military Personnel File
ORB	Officer Retention Board
OVER	Officer Volunteer Early Release Program
PFT	Physical Fitness Test
PII	Personably Identifiable Information
PLC	Platoon Leaders Course
TBS	The Basic School
TFDW	Total Forces Data Warehouse
USNA	United States Naval Academy

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To my wife, Sherri, I love you and thank you for your continued support as I pursue my Marine Corps Career.

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I.   INTRODUCTION

A.   BACKGROUND

The United States Marine Corps, like its sister services, operates in a manner similar to a closed shop, "A business establishment in which union membership is a condition of employment" (Random House Kernerman Webster's College Dictionary, 2010). Although the Marine Corps is not a union, there are barriers to lateral entry. The Marine Corps is unable to head-hunt for senior leaders outside the organization if the organization fails to perform. The few officers who reach the highest ranks of senior leadership will have worked within the organization since their commissioning; therefore, the quality of junior officers who are retained today will be reflected in the senior leadership of the future. This demonstrates the importance to the Marine Corps of retaining the highest-quality officers at the earliest opportunity. This study examines the rate at which officers, who have been deemed high-quality, exit the Marine Corps and whether significant factors exist to predict their departure.

The Marine Corps grew substantially while engaged in the Iraq and Afghanistan conflicts, reaching the officer end-strength wartime high of 18,733 in 2009 (Office of the Under Secretary of Defense, 2009). A 2010 force structure review determined that the ideal size of the Corps, post Afghanistan, was a total end strength 186,800 (U.S. Marine Corps Concepts & Programs, 2014). The Marine Corps introduced multiple programs to reduce in end strength, while retaining the most highly qualified officers. In 2010, Marine administrative message (MARADMIN) 021/10 announced the return to competitive career designation. As stated, "Career designation is a force shaping tool that allows for the management of the officer population by retaining the best qualified officers from each year group" (2010, p. 1). Additional force shaping measures followed shortly thereafter.

The officer voluntary early release (OVER) program, introduced in 2012, gave junior officers the opportunity to depart service 180 days prior to their end of active service (EAS) (MARADMIN 441/12, 2012). The combination of these programs

provides a unique opportunity to research and identify what quality of junior officer the Marine Corps is retaining and losing.

The establishment of the competitive career designation board applies to this research because it provides a measure of quality that determines the officers, in each competitive category, that the Marine Corps is willing to part with—and those it desires to retain. The level of competitiveness for the Officer Retention Board (ORB) in a given year is determined by the manpower needs of the Marine Corps. Since its establishment in 2010, the percentage retained across each category ranges from a low of 55 percent to "All Qualified" in the specialized fields of Law and Aviation (see Table 1).

Table 1.   Historical Career Designation Selection Rates

CD Board	Ground	Combat Service Support	Aviation-Ground	Law	Aviation
FY10 ORB #1	85%	85%	85%	ALL QUALIFIED	ALL QUALIFIED
FY10 ORB #2	80%	80%	80%	ALL QUALIFIED	ALL QUALIFIED
FY11 ORB #1	65%	65%	65%	ALL QUALIFIED	ALL QUALIFIED
FY11 ORB #2	65%	65%	65%	ALL QUALIFIED	ALL QUALIFIED
FY12 ORB #1	60%	60%	60%	85%	95%
FY12 ORB #2	60%	60%	60%	85%	95%
FY13 ORB #1	55%	55%	55%	85%	95%
FY13 ORB #2	55%	55%	55%	85%	95%
FY14 ORB #1	55%	55%	55%	85%	95%
FY14 ORB #2	70%	70%	70%	85%	95%
FY15 ORB #1	80%	80%	80%	85%	95%
FY15 ORB #2	80%	80%	80%	85%	95%

Source: According to Garza, P. R. MPP-30, M&RA, HQMC (personal communication, December 15, 2015).

The results of the ORB are one of three measures of quality that we use during this research. The meritorious designation program and class standing while attending The Basic School (TBS) provide additional metrics to categorize junior officer quality.

B.   PURPOSE

Recent publications, like Tim Kane's 2012 book, *Bleeding Talent: How the U.S. Military Mismanages Great Leaders and Why It's Time for a Revolution*, suggests that the best and brightest officers are departing the service. The competitive career designation program provides an ideal opportunity to investigate this claim within the junior officer ranks of the Marine Corps. We analyze what factors are significant to the departure of high-quality junior Marine officers, and compare performance measures of the officers who continue service.

C.   RESEARCH QUESTIONS

1.   Primary

- What factors are significant to a career designated junior officer's decision to leave the Marine Corps?

- How do measures of performance compare between the high-quality officers who remain in service, against those who leave?

- Is the source of career designation, meritorious or board, significant in a junior officer's decision to exit the service?

2.   Secondary

- What entry level variables are significant to an officer receiving meritorious designation at TBS?

- Is TBS class third significant in predicting selection for the ORB?

Our research shows that the most talented junior officers are not leaving the Marine Corps in large percentages, but a higher GCT score is correlated with higher rates of departure. Meritoriously designated officers retain at 82 percent, and 76 percent of officers who graduate in the top 15 percent of their TBS class continue service. We further show that an officer's performance at TBS relates to performance over an officer's initial obligation, and that officers from the enlisted commissioning pipeline are more likely to meritoriously designate and continue service.

D. SCOPE AND LIMITATION

This study analyzes the loss of high-quality junior Marine officers following their initial obligation of service. For the purposes of this study, junior officers are deemed high quality if they are offered career designation meritoriously at TBS or later selected by the ORB. We include the metrics of TBS class percentile to further define varying levels of officer quality. In order to capture the retention patterns of junior officers following the establishment of competitive career designation, the sample population is limited to officers who commissioned in fiscal years (FY) 2010, 2011 and 2012. We select these specific years in order to observe the sample population to the decision point of exiting or continuing service. The research is quantitative and is executed by building economic models that determine factors significant to various measures of quality. The officers who were offered career designation through the ORB or meritoriously at TBS are isolated, and this specific population is used in identifying factors significant to exiting the service.

We construct our models using numerous personal and professional measures. The Total Forces Data Warehouse (TFDW) provides officer panel data over an officer's first obligation, and TBS provides early measures of performance. The primary and secondary questions are confirmed, denied, or found inconclusive through the use of statistical analysis.

E. ORGANIZATION OF THE STUDY

This research is organized into six Chapters. Chapter I provides the background and purpose of this study, and introduces the primary and secondary research questions. Chapter II details the establishment of the career designation program and the various methods through which a junior officer may receive career designation. Chapter III reviews recent literature that relates to the measures of quality and the retention of high-quality individuals used in this analysis. Chapter IV describes the construction and cleaning of the TFDW and TBS data, introduces three probit models, and explains the

steps used to merge the data into one final set. Chapter V provides the model results from the multivariate data analysis. Chapter VI presents the conclusions and recommendations of this study.

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II. USMC RETENTION OF QUALITY OFFICERS

A. INTRODUCTION

In January of 2010, the Marine Corps released MARADMIN 021/10, announcing a return to the competitive career designation of active-duty officers. Career designation serves as a tool to shape and manage the officer population. The ORB screens each qualified officer, and the selects members who are given the opportunity to continue service on active duty.

The ORB relies on an officer's official record to reach its decisions. Each individual is responsible for ensuring that his/her records are complete and accurate. The two tools used during the board are an officer's Master Brief Sheet (MBS) and Official Military Personnel File (OMPF). Retention boards are held semiannually during the months of January and July (MCO 1001.45J, 2008). The career designation process provides a filter for quality among the junior officer population. Officers can take one of three paths to career designation: TBS meritorious designation, the ORB, or through the Commanding General's Meritorious Program. We explain the process of each program throughout this chapter.

B. OFFICER RETENTION BOARD

In order to be considered by the ORB, each officer is required to meet specific criteria:

(1) Unrestricted officer in the active component.

(2) 540-days of observed fitness report time.

(3) An officer's first opportunity for career designation consideration will coincide with that officer being in the promotion zone for the captain promotion selection board. Officers who do not meet the 540-day observed time requirement when in-zone for captain will be considered for career designation at a subsequent board after achieving 540-days observed time.

(4) Additionally, if an officer is unable to meet the above criteria, to be viewed by the board within their expiration of active service (EAS), they are able to request an active duty extension. (MARADMIN 021/10, p. 1)

The ORB divides the officer population into five competitive categories: Combat Arms, Combat Service Support, Air-Ground, Aviation, and Law. Officers have the opportunity to deny consideration by the ORB by submitting an administrative action (AA) form signed by the first O-5 commander in their chain of command (MARADMIN 021/10).

When the ORB releases the results of a board, selected officers have 45 days to accept or decline their designation. If selected officers decline, they must exit the Marine Corps upon their EAS. Officers who are selected and accept designation are required to serve an additional two years of service beginning in June of the year they accept. Requests for extensions for the decision past the 45 days following designation are not encouraged (MARADMIN 021/10).

The force needs of the Marine Corps determine the competitiveness of a board in a given year. During years of high competitiveness, the board may designate officers to serve as alternates. Officers who are selected as alternates must extend their active duty status to remain on the alternate list. Alternates will serve to fill vacancies if primary selected officers decline their designation (MCO 1001.45J).

C.   MERITORIOUS CAREER DESIGNATION PROGRAMS

Two programs present Marine officers the opportunity to receive career designation outside the results of the ORB.

1.   The Basic School Designation Program

The Marine officer population, regardless of entry source attends the six-month TBS course following commissioning. During this course, junior officers are graded in three broad categories: military skills, academics and leadership. During the conduct of the course, each officer is ranked among their fellow officers from first to last. The Commanding General, Marine Corps Combat Development Command, Quantico, VA is authorized to nominate the top 5 percent of each graduating class for meritorious career

designation. Officers are eligible for the meritorious program if they are a citizen, possess a bachelor's degree, are medically qualified, and are able to complete 20 years of service prior to the age of 62 (MCO 1001.45J).

2.   Commanding General's Meritorious Career Designation Program

Commanding Generals of numerous commands may be assigned a given number of career designation quotas based on the eligible population in each command. The quotas assigned to each command are released through a MARADMIN following the conclusion of each ORB. When quotas are available, Commanding Generals are authorized to recommend Marine officers who were eligible, but not selected during the previous ORB (MCO 1001.65). For the purpose of this research, the term meritorious designation refers to the TBS designation program and not to the commanding general's designation program.

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III. LITERATURE REVIEW

A. OVERVIEW

Multiple bodies of research focus on factors that determine officer quality, career designation, and the loss of talented military officers. We review studies that apply a number of approaches to reach their conclusions, to include surveys, quantitative and qualitative analyses. Our study is unique in that it combines the elements of retention, performance, and quality to the Marine Corps junior officer population.

The establishment of the Marine Corps career designation program in 2010 is an additional quality filter for the officer population. Research on retention behaviors of officers after the offer of designation has not been formally studied. The literature review directly relates to numerous variables that assist in determining how a given officer is deemed to be of high-quality, and reasons why one would decide to exit the service. The studies link to the current analysis by the quantitative methods or qualitative concepts used to measure the quality of a first-term Marine officer.

B. SIMILAR STUDIES

1. Garza (2014)

Garza examines the significant factors that lead to a Marine officer's designation by the ORB. The study utilizes a sample of 6,732 Marine officers to conduct a statistical analysis of factors that increase the likelihood of career designation across the five competitive categories: Combat Arms, Combat Service Support, Aviation-Ground, Law, and Aviation. The sample data set includes officers viewed by the board between 2010 and 2013.

The research data includes a collection from numerous sources to provide background information, demographics, MOS, performance measures, deployment experience and fitness report evaluations. Of the 6,732 officers in the sample, 4,723 were offered career designation during this period, roughly equating to an average of 70 percent across eight ORBs. The percentage of officers offered designation in each

competitive category remains dynamic, and shifts through fiscal years, based on the manpower goals for these years. The designation rate reaches a low of 55 percent in FY 2013, and a high of "all qualified" officers for the Aviation and Law competitive categories during FY 2010–2011. For each of the competitive categories, across the eight selection boards, Garza uses a probit model to determine significant factors correlated with career designation.

Results and significant variables proved to fluctuate by competitive category, but a number of the independent variables are significant across multiple fields. These variables include the following: the reviewing officer's relative value average as the most significant, prior enlisted service is significant in three of the five categories, and high performance on the physical and combat fitness tests all correlate positively with the likelihood of being selected. A significant variable that arises in the Combat arms category is the prior enlisted officer variable. Garza writes that when all else is held constant, "An officer who was commissioned through an enlisted to officer program has a 19.6 ppts higher probability of being selected than an officer who was commissioned through the USNA" (Garza, p. 66).

The Garza study provides insight in defining how the Marine Corps measures high-quality through the lens of the ORB, but the level of competitiveness changes based on the needs of the Corps for any given year. Identifying the top 70 percent (4,723/6732) as high quality may be a stretch, but it aids in establishing a benchmark for the officers with whom the Marine Corps is willing to part and those whom it desires to keep. A significant quality consideration that was not included in this study is The Basic School's career designation program.

Our study does not seek to replicate Garza's work, but to continue analyzing the retention patterns of officers who have been deemed worthy of continued service post ORB. Additionally, our research includes TBS performance as determinants of the ORB and seeks to identify if the manner in which an officer is designated is significant in the decision to exit the service.

2.   **Wiler and Hurndon (2008)**

Wiler and Hurndon identify factors that predict junior officer performance in the U.S. Marine Corps. They complete the study using a sample of all commissioned officers between the years of 1998 through 2005. The analysis primarily focuses on the effect of performance at TBS and its relationship to junior officer future performance in the operating forces. Student data from TBS is merged with the officer's performance evaluations during their first term, and they were able to conclude the following: "Officers who finish TBS in the top third of their TBS company receive higher average fitness report scores than officers who finish in the middle third; conversely, officers in the bottom third of their TBS class receive lower fitness report scores than those in the middle third" (Wiler & Hurndon, p. i).

The findings allow the authors to draw several conclusions about the evaluation process aboard TBS. Using the three measures of performance, leadership, academics, and military skills, they find that leadership skills has the most significant impact on predicting future performance in the operating forces. Academic performance is also statistically significant; however, it lacks the magnitude to largely affect fitness report scores without a vast change in student's academic standing (Wiler & Hurndon, 2008).

The study shows that the military skills scores do not have a predictive effect on a junior officer's performance. Using an unrestricted and restricted model, which omits students with aviation contracts, the authors conclude that class standing in the basic school is a valid predictor of future performance and they recommended that the leadership score is given more weight in the overall evaluation process (Wiler & Hurndon, 2008).

The Wiler and Hurndon study confirms that performance and class standing at TBS are strong predictors of future performance. Our study narrows the focus to the top 30th percentile of graduates and determines if TBS class standing is significant to departure decisions. As explained in the introduction, the top 5 percent of students are offered meritorious career designation at TBS. We seek to identify a difference in exit behavior between the officers who are offered designation early and those who are

designated by ORB. It is of value that the Wiler and Hurndon study focuses on officers in the rank of Captain and below, as this is similar to the population relevant to the current study.

3. Cancian and Klein (2015)

Cancian and Klein study the declining General Classification Test (GCT) scores of Marine Corps officers from 1980 to 2014. The GCT is an intelligence test that was developed during World War II to assist in classifying service members during the rapid buildup of forces. "By the end of the War, over 12 million men and woman had been administered the test" (p. 5). The test was replaced by the Armed Services Vocational Aptitude Battery (ASVAB) and, as of 2015; the Marine Corps is the only service that continues to give the GCT (Cancian & Klien, 2015).

Performance on the GCT is not a factor for commission in the Marine Corps, but the test is still administered to newly commissioned officers while they are attending TBS in Quantico, Virginia. Data utilized during their study contains only test scores, without individual level characteristics. The authors "show a statistically significant and quantitatively meaningful decline in the quality of commissioned officers from 1980 to 2014 as measured by the scores of Marine officers on the General Classification Test (GCT)" (Cancian & Klein, p. 1).

The GCT may serve a limited role in today's Marine Corps, but the author's reference evidence that the results have a history of predicting performance at Officer's Candidate School and The Basic School. They write that much of the attrition during OCS is contributed to the physical intensity, rather than the intelligence level of an individual. However, historically, many of the failures at OCS also had marginally qualifying GCT scores. Removing the GCT score from the commissioning equation has led to a new formula for the All-Volunteer Force (AVF) where a bachelor's degree and completion of OCS is enough to earn a commission. In an organization that does not allow lateral entry, intellectual health proves to be important because junior officers will eventually lead the organization (Cancian & Klein, 2015).

The GCT study addresses numerous other factors that may be correlated with officer intelligence levels, such as affirmative action and the increased participation of female officers since 1980. The authors do not find a significant correlation with reduced performance that could be attributed to either increased diversity or gender. During the same time period, there is a significant increase in the college participation rates, and this has contributed to a larger candidate pool. They find that the larger pool of potential candidates is the dominant correlate to the declining test scores (Cancian & Klein, 2015)

Cancian and Klein conclude by considering that 20 percent of the federal budget is spent on operating and maintaining the military. Since the inception of the AVF, the quality of the enlisted force has been heavily scrutinized and measured, but the same cannot be said of the officer ranks. Officers comprise 16 percent of the force and are responsible for the leadership of a closed system. The authors recommend further research be conducted into the possibility of that officer quality is diminishing, and from the standpoint that a less-intelligent officer corps would inevitably lead to poorer performance of the force as a whole (Cancian & Klein, 2015).

4.   Tim Kane (2011)

In his book, *Bleeding Talent: How the U.S. Military Mismanages Great Leaders and Why It's Time for a Revolution*, Kane (2011) presents, "New evidence that the attrition rate of the 'Best' officers has become a crisis in the contemporary army" (p. 4). He surveys 250 West Point graduates of the classes from 1989, 1991, 1995, 2000, 2001, and 2004. Of those surveyed, 31 percent of the population remained on active duty. Of the respondents who continued service past their initial obligation, three attained the rank of Colonel, 41 Lieutenant Colonel, and 38 Major. Kane uses this distribution to emphasize that the sample of respondents is not comprised of disgruntled officers who resigned their commission at an early point in their career. The results of this study provide insight as to why an officer of high quality may choose to exit the service.

The survey results show that 7 percent of the officers felt that the best officers remain in the military, while nearly 50 percent felt that half of the best officers remain on active duty, the latter representing the middle ground of the survey questions (Kane,

2011, p. 218). Much of this logic is attributed to the idea that even though the army is great at developing leaders, it has a difficult time managing talent. Many of the respondents felt that the military promotion system is based on seniority rather than merit, and that promotions up to Lieutenant Colonel could be predicted with relative ease. Furthermore, as officers' careers progress, they are "promoted" into staff jobs, where they may have preferred to specialize in their selected field. The bureaucratic nature of the personnel system equates to ticket punching specific billets along a given route to reach the highest levels of command. Combined, these elements serve to stifle creative entrepreneurial behavior, and may drive talented officers to seek employment in the private sector (Kane, 2011).

The main limitation of this study is the small homogenous pool of survey participants. Applying the views of 250 West Point graduates to the entire army officer population may provide a narrow view. However, the study provides insight into the factors due to which a high-quality officer may be driven to resign, and how the military can mitigate those factors through organizational redesign. The Kane book relates to the current study in concept. While Kane relies on surveys and opinions to determine that quality is being lost, we focus on a quantitative analysis of the officers who have been vetted through the career designation process, and different levels of quality based on TBS standing. We conduct an analysis on the percentage of quality officers departing the Marine Corps, and how their performance measures compare to those who continue service.

C.   CHAPTER SUMMARY

The previous studies identify important factors that aid in defining high-quality junior officers and why such officers may decide to exit the Marine Corps. Additionally, the studies assist in reinforcing measures of quality. The TBS evaluation process appears to serve the intended purpose of identifying early potential in junior officers. Students in the upper third of their class receive higher fitness reports, on average, than those ranking in the lower two thirds. For the officers who compete on the ORB at the end of their initial term, their performance evaluations prove the most significant predictor for

selection to career designation. Although GCT scores are no longer a factor in earning of a commission, the scores have been declining since 1980 and may still possess value as a measure of intelligence.

The career designation study, completed by Garza, is of particular interest due to the methods and population sample used. Selection to career designation, both meritoriously and through the ORB, serves as the key explanatory variable in the final model of this research. We will focus on the career choices of high-quality officers following the results of the designation board, and seek to determine whether the source of designation has statistical significance on an officer's decision to leave the service.

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IV. DATA AND PRELIMINARY ANALYSIS

A. INTRODUCTION

The purpose of this chapter is to describe and define the data sources we use during this research. Additionally, we introduce three models and explain the process for creating the dependent and independent variables.

B. DATA SOURCES

We retrieve the data for this research from two sources: The Total Forces Data Warehouse (TFDW) and TBS. TFDW provides panel data for Marine Corps officers during their initial obligation of service. We augment the TFDW data with the records of student officer performance from TBS. The final merged data includes 3,917 observations used to identify measures of quality, and the loss of high-quality individuals who were commissioned in the years 2010 to 2012. We select the years to capture the behavior of high-quality junior officers who were vetted through the competitive career designation program established in 2010.

1. TFDW Data

TFDW provides cross-sectional panel data for all Marine officers who commissioned during FY 2010–2012. The TFDW data contains monthly "snapshots" that records various data for a given officer. The snapshots result in multiple files containing numerous entries for each unique observation. The initial data has a sample size of 4,288 officers from the stated years. We use this data to derive both dependent and independent variables for each model.

2. The Basic School Data

TBS data provides the commissioning source, demographics, final class standing, class size, and assigned MOS for each Marine officer at the point of graduation. The data arrives in two files. The first file contains the student's demographic data, commissioning source, academic score, military skills score, leadership score, overall GPA, and overall class standing. The final scores of each class are broken down into thirds, and each

officer is assigned a one, two, or three designating into which third his or her final score fell within their given class. Officers ranking in the top third of their class receive a 1, whereas an officer in the bottom third receives a 3. The data also includes the MOS that each student received upon graduation from the course. This data initially contained 5,169 observations that included international students, active, and reserve components.

The second file provided by TBS is retrieved from the Marine Corps Training Information Management System (MCTIMS), the authoritative training source for all training data, and contains 4,649 unique observations. This data provides an officer's class designator, Electronic Data Interchange Personal Identifier (EDIPI), and final class standing upon graduation. The difference in observations between the two sets equates to the loss of 520 observations. This loss is partly attributed to the absence of EDIPI numbers for the first two classes of 2010. The initial TBS data records 544 individuals enrolled in the first two courses of 2010; additional factors such as drops and international students could account for the difference in observations.

3.   Data Coding and Cleaning

Numerous files require cleaning prior to completing the data merge. This is the case with the measures of performance that includes rifle, pistol, CFT, and PFT scores. Each officer records the events multiple times through his/her initial obligation. We take the average of the variables based on the EDIPI entries for each individual. This allows us to capture a picture of sustained performance and not merely a high or low for a given year. The GCT variable has multiple entries for each EDIPI, but in most cases one entry is blank while the second holds a score. We isolate the highest GCT score for each observation, and record the score as the GCT variable. If observations are missing a GCT score, we drop them from the sample. The MOS variable appears with multiple entries. We isolate the final MOS entry for each officer, and use the MOS code to derive the competitive category for career designation.

The career designation file is prepared for use in its current state. Each officer is assigned a code that represents his/her current designation status. The individual

designation codes are tied to a snapshot date that represents the specific date of entry into the officer's file. An officer will receive one of six codes (see Table 2).

Table 2.   Career Designation Codes

CD_Code	Description
0	None
1	Board Considered
2	List of Selectees
5	Not Selected for Career Designation
6	Career Designated
7	Final Non-acceptance

Adapted from: Halton, M. (2015, January 5). Career designation pre-board population identification.[Power Point Presentation].

A measure of quality that is important with respect to the primary question is whether an officer is offered career designation by the ORB. Officers who meet this criterion receive a code of 2, 6, or 7. Each of these codes represents an officer who was vetted by the ORB and given the opportunity to accept career designation. An officer who receives a 2 is still in the decision process, whereas a 6 represents an officer who accepted career designation and a 7 represents an officer who has declined designation and is prepared to execute their EAS. The combination of these specific codes represents 53.67 percent of the sample population (see Table 3).

Table 3.   Frequency of CD Codes Entire Sample

CD Code	Freq.	Percent
0	1,455	37.15
1	3	0.08
2	8	0.2
5	351	8.96
6	1,799	45.93
7	301	7.68
Total	3,917	100

An important explanatory variable for the primary question is the impact of receiving meritorious designation at TBS. We use two methods to derive and verify meritorious designation. The first step is to identify the observations that record a code 6, representing career designation, and isolating the snapshot date of the code entry. As stated in Chapter II, to qualify for the ORB, an officer must have 540 days' worth of observed fitness report evaluations. This criterion, combined with the roughly six months required to complete TBS, is used to establish a cutoff date of 730 days from commissioning. If a code 6 is recorded prior to 730 days, the officer is temporarily coded as meritoriously designated. The distribution of this variable shows the initial spike of officers receiving meritorious designation following completion of TBS (see Figure 1).

Figure 1.   Snapshot Date Code 6 Distribution
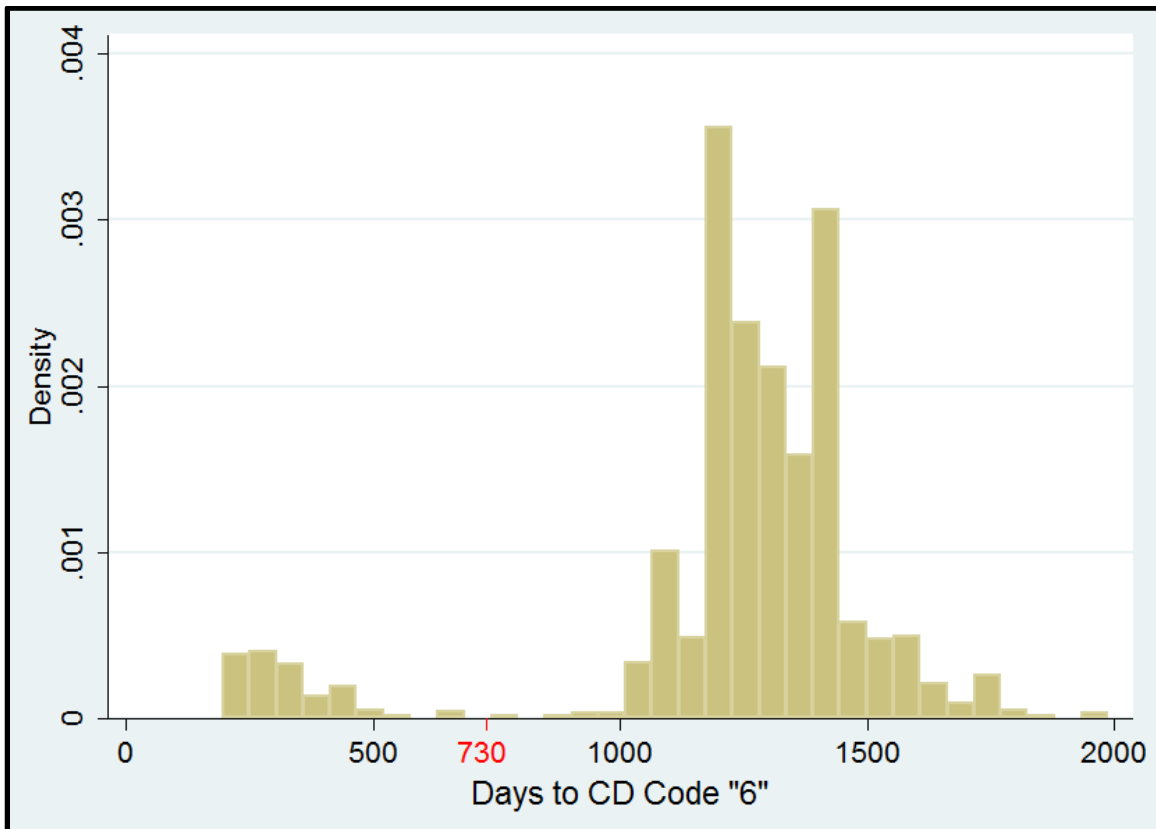
The "Snapshot" date method results in 177 observations receiving a career designation code prior to the 730 day cut off. This equates to 4.5 percent of the sample population, a percentage that falls below the top 5 percent standard. This reduced percentage may be caused by a delay in the administrative system. In order to validate the snapshot method, we calculate the top 5 percent from each TBS class based on their class size and standing.

We compare the two methods for deriving meritorious designation side by side and identify and isolate non-matches. The comparison results in 33 non-matches: 23 that do not meet the snapshot criteria, and 10 that do not meet the top 5 percent criteria. The observations that did not meet the snapshot criteria had a range of class standings from 1–14, and the observation that did not meet the top 5 percent criteria ranged from 10–16. Within the top 5 percent standings from TBS, 14 observations record a designation code of zero or blank for the career designation code.

We continue by analyzing the class size from each TBS cohort to verify the meritorious variable. From FY 2010 to FY 2012, TBS class size in the data ranged from 199 to 283 students. This results in a top 5 percent standing with an upper bound from 9.95 to 14.15 overall standing. The conclusion for deriving this variable is to maintain the observations that received a snapshot code prior to 730 days, and to include the observations that fell within the top 5 percent of their class. The end result is 200 meritorious designations representing 5.1 percent of the total sample population (see Table 4).

Table 4.   Meritorious Career Designation

Variable	Observations	Mean	Std. Dev.
Meritorious_CD	3917	0.051	0.220

The TFDW demographics file provides race, ethnicity, level of education attained, and marital status. In many cases, officers have multiple entries over a term, as some of these variables change over time. We isolate each EDIPI number and record the final entry for marital status and education (see Table 5).

Table 5.   Sample Demographics

Demographics	Obs	Mean	Std. Dev.	Min	Max
Age at Commission	3917	24.313	2.777	19.655	38.937
Male	3917	0.910	0.286	0.000	1.000
Female	3917	0.090	0.286	0.000	1.000
White	3917	0.755	0.430	0.000	1.000
Non-White	3917	0.245	0.430	0.000	1.000
Married	3917	0.530	0.499	0.000	1.000

We discover a slight variation in the race variable between the two data sources. The TFDW data contains a "decline to respond" option that is not present in the TBS data. The TBS data provides a more diverse sample. We utilize the TBS data to create the white and non-white demographic variable.

Both data sets contain the commissioning source for each observation. We use the TBS data because it is cleaner and the sources were clear. The Commissioning sources fall into one of the following categories: United States Naval Academy (USNA), Platoon Leaders Course (PLC), Officers Candidate Course (OCC), Marine Enlisted Commissioning Program (MECEP), Meritorious Commissioning Program (MCP), Enlisted Commissioning Program (ECP), reserve, transfer, and other. We merge the enlisted commissioning programs of MECEP, MCP, ECP into one variable. This is due to the fact that ECP and MCP only represent 2.6 percent of the sample. We combine the sources of transfer and other into a single variable of "Other." The reserve commissions remain as their own variable. The merging of similar programs and dropping missing performance variables, results in seven individual commissioning sources with 3,917 observations (see Table 6).

Table 6.   Commissioning Source Summary Statistics

Commissioning Source	Obs	Mean	Std. Dev.
USNA	3917	0.185	0.389
NROTC	3917	0.168	0.374
OCC	3917	0.157	0.364
PLC	3917	0.302	0.459
ENL_Prog	3917	0.127	0.333
Reserve	3917	0.040	0.196
Other_Prog	3917	0.020	0.141

TFDW provides the separations file that is ready for use in its current state. If an officer separates from the Marine Corps, he/she receives a separations code, description and characterization. The separations data is used to construct the "Honorable Discharge" variable to answer the primary question (see Table 7).

Table 7.   Discharge Characterization

Discharge Characterization	Freq.	Percent
DEATH	9	1.12
GENERAL DISCHARGE	31	3.84
HONORABLE DISCHARGE	762	94.42
OTHER THAN HONORABLE CONDITIONS	5	0.62
Total	807	100

4.   Final Dataset

We merge the final TFDW and TBS datasets using each observation's unique EDIPI number. The individual rows are matched using the JMP program on a one-to-one basis. Once the merge is complete, we drop EDIPI numbers and assign a unique ID number. The final data set contains 3,917 observations of Marine Corps officers who commission between the years of FY 2010 to FY 2012. The dataset includes independent variables in the categories of demographics, commissioning source, performance measures, career designation competitive category and measures of quality. We explain the models and variables further in the next section of this chapter.

C.   MODEL POPULATIONS

We apply a multi-step approach to each model that focuses on unique populations and narrows to specific measures of quality. The following section introduces the probit model and the dependent and independent variables. The population sample for each model becomes more restrictive, as specific variables are required for an observation to qualify for the model.

1.   Probit Model

The Probit model has numerous applications in the social sciences. Liao explains, in *Linear Probability, Logit, and Probit Models* (1994), "The probit model represents another type of widely used statistical model for studying data with binomial distributions" (p. 11). The response variable can only take on two forms, either an event occurs or it does not. We present three models in this form: officer i is meritoriously career designated or not, board selected or not, and departs service or not.

2.   Model 1

$$\text{Prob}(Y_{it}) = \Phi\left(\beta_0 + \beta_1 \text{GCT}_{it} + \mathbf{X}_i' \boldsymbol{\delta} + \mathbf{Z}_{it}' \boldsymbol{\lambda}\right)$$

where Y is a dummy variable equal to 1 if Marine officer i is meritoriously designated in year t. *GCT* is a continuous variable for officer i, denoting the recorded score on the test. **X** is a vector of commissioning source dummy variables for Marine officer i including USNA, PLC, OCC, enlisted program, reserve and other. The vector **Z** represents demographic variables including age at commissioning, and dummy variables denoting marital status, gender and race of officer i in year t.

Model 1 includes the entire sample population of 3,917 observations. We use the model to determine significant factors in the probability that an entry level officer will receive meritorious designation at TBS.

3. Model 2

$$\text{Prob}(Y_{it}) = \Phi\,(\beta_0 + \beta_1 GCT_{it} + \beta_2 TBS\_Bottom\_Third_i + \beta_3 TBS\_Middle\_Third_i + \mathbf{V'_i}\boldsymbol{\gamma} + \mathbf{W'_{it}}\boldsymbol{\xi} + \mathbf{X'_i}\boldsymbol{\delta} + \mathbf{Z'_{it}}\boldsymbol{\lambda})$$

where *Y* is a dummy variable equal to 1 if Marine officer *i* is selected for career designation by the ORB and commissioned in year *t*. *GCT* is a continuous variable for officer *i*, denoting the recorded score on the test. *TBS_Bottom_Third* is a dummy variable indicating graduating in the bottom third of officer *i*'s class. *TBS_Middle_Third* is a dummy variable indicating graduating in the middle third of officer *i*'s class. **V** denotes a vector of continuous performance variables that includes PFT average, CFT average, rifle average, pistol average, and degree beyond bachelor's. **W** denotes a vector of dummy variables for the career designation competitive categories including Ground, Air-Ground, CSS and Law. **X** denotes a vector of dummy variables for officer *i*'s commissioning source in year *t*. **Z** denotes a vector of officer *i*'s demographics including years if service, and dummy variables denoting marital status, gender and race.

Model 2 isolates officers who receive a career designation code other than zero and has 2,242 observations. We use the model to determine significant factors in selection by the ORB. Marine officers coded as meritoriously designated are excluded from Model 2. The Air competitive category is excluded due to the lack of career designation codes.

4. Model 3a

$$\text{Prob}(Y_{it}) = \Phi\,(\beta_0 + \beta_1 GCT_{it} + \beta_2 MCD_i + \beta_3 Board\_Sel_i + \mathbf{V'_i}\boldsymbol{\gamma} + \mathbf{W'_{it}}\boldsymbol{\xi} + \mathbf{X'_i}\boldsymbol{\delta} + \mathbf{Z'_{it}}\boldsymbol{\lambda})$$

where *Y* is a dummy variable equal to 1 if Marine officer *i* was offered career designation, through either source, and exits the service with an honorable discharge. *GCT* is a continuous variable for officer *i*, denoting the recorded score on the test. *MCD* is a dummy variable indicating meritorious designation of officer *i*. *Board_Sel* is a dummy variable indicating the ORB selection for officer *i*. **V** denotes a vector of continuous performance variables that includes PFT average, CFT average, rifle average, pistol average, and degree beyond bachelor's. **W** denotes a vector of dummy variables for

the career designation competitive categories including Ground, Air-Ground, CSS and Law. **X** denotes a vector of dummy variables for officer i's commissioning source in year t. **Z** denotes a vector of officer i's demographics including years if service, and dummy variables denoting marital status, gender and race.

5. Model 3b

$$\text{Prob}(Y_{it}) = \Phi\,(\beta_0 + \beta_1 GCT_{it} + \beta_2 MCD_i + \beta_3 TBS\_6\text{–}15_i + \beta_4 TBS\_16\text{–}30_i + \mathbf{V_i'}\boldsymbol{\gamma} + \mathbf{W_{it}'}\boldsymbol{\xi} + \mathbf{X_i'}\boldsymbol{\delta} + \mathbf{Z_{it}'}\boldsymbol{\lambda})$$

Model 3b measures the same dependent variable of exiting service and sample population as Model 3a. The difference from Model 3a is the inclusion of the TBS graduation percentiles. *TBS_6–15* is a dummy variable indicating graduating in the top 6–15 percentile of TBS for officer i. *TBS_16–30* is a dummy variable indicating graduating in the top 16–30 percentile of TBS for officer i. The remaining vectors are identical to Model 3a.

Model 3a and 3b are the most restrictive models. They serve to answer the primary question of factors significant to a high-quality junior officer's decision to leave the Marine Corps. The sample population has 2,062 observations and includes officers who received meritorious designation and those that were offered designation by the ORB. Exclusions include the Air competitive category and officers who were not offered the opportunity of career designation.

D. VARIABLES

We further define the variables of each model in the following paragraphs, and display the sample summary statistics. Each table shows the range, describing a value of 1 or 0 for binary variables, or a min and max for continuous variables. The min and max within these tables represents the observations within the data, and not the minimum or maximum attainable score of a given variable.

1. Dependent Variables

The three models are used to measure varying levels of quality and departure behavior. The dependent variables and summary statistics for each model reflect the sample population of the individual model.

a. *Meritorious Designation TBS*

This is a binary variable that takes on a value of 1, if the officer is meritoriously designated as a top 5 percent graduate of TBS, and a value of 0 if the officer was not. As discussed previously in the chapter, we construct this variable using a combination of both data sets. Meritorious designation and results of the ORB are mutually exclusive. An officer that is coded as a 1 for meritorious designation will take on the value of 0 for the independent variable of board select (see Table 8).

Table 8.   Summary Statistics Model 1

Variable	Obs	Mean	Std. Dev.	Min	Max
Meritorious CD	3917	0.051	0.220	0.000	1.000
USNA	3917	0.185	0.389	0.000	1.000
NROTC	3917	0.168	0.374	0.000	1.000
OCC	3917	0.157	0.364	0.000	1.000
PLC	3917	0.302	0.459	0.000	1.000
ENL Prog	3917	0.127	0.333	0.000	1.000
Reserve	3917	0.040	0.196	0.000	1.000
Other Prog	3917	0.020	0.141	0.000	1.000
GCT Score	3917	124.257	9.330	80.000	154.000
Age at Commission	3917	24.313	2.777	19.655	38.937
Female	3917	0.090	0.286	0.000	1.000
White	3917	0.755	0.430	0.000	1.000
Non-White	3917	0.245	0.430	0.000	1.000
Married	3917	0.530	0.499	0.000	1.000
FY2010	3917	0.384	0.486	0.000	1.000
FY2011	3917	0.422	0.494	0.000	1.000
FY2012	3917	0.194	0.395	0.000	1.000

b. *Board Select*

This is a binary variable that takes on a value of 1, if the officer was vetted by the ORB and offered the opportunity of career designation. To receive a value of 1, an officer is required to record a career designation code of 2, 6 or 7. We remove individuals with

missing designation codes and individuals coded as meritoriously designated from the population. The Air competitive category is excluded from the model due to 93.5 percent of the sample missing career designation codes (see Tables 9 and 10).

Table 9.   Summary Statistics Model 2

Variable	Obs	Mean	Std. Dev.	Min	Max
Board_Select	2242	0.843	0.364	0.000	1.000
Top3rd	2242	0.302	0.459	0.000	1.000
Middle3rd	2242	0.361	0.480	0.000	1.000
Bottom3rd	2242	0.338	0.473	0.000	1.000
USNA	2242	0.141	0.349	0.000	1.000
NROTC	2242	0.197	0.398	0.000	1.000
OCC	2242	0.170	0.376	0.000	1.000
PLC	2242	0.296	0.456	0.000	1.000
ENL_Prog	2242	0.136	0.343	0.000	1.000
Reserve	2242	0.045	0.208	0.000	1.000
Other_Prog	2242	0.013	0.115	0.000	1.000
GCTScore	2242	122.984	9.123	80.000	154.000
Beyond_Bachelor	2242	0.040	0.195	0.000	1.000
PFT_Avg	2242	272.249	25.137	63.000	300.000
CFT_Avg	2242	292.329	19.740	60.000	300.000
Rifle_Avg	2242	311.992	14.453	215.000	340.000
Pistol_Avg	2242	325.823	26.891	235.000	386.000
Years of Service	2242	3.665	3.610	0.000	17.000
Female	2242	0.094	0.291	0.000	1.000
Non_White	2242	0.256	0.437	0.000	1.000
Married	2242	0.533	0.499	0.000	1.000
CSS	2242	0.573	0.495	0.000	1.000
Ground	2242	0.289	0.454	0.000	1.000
AirGround	2242	0.107	0.309	0.000	1.000
Law	2242	0.030	0.172	0.000	1.000
FY2010	2242	0.462	0.499	0.000	1.000
FY2011	2242	0.482	0.500	0.000	1.000
FY2012	2242	0.056	0.229	0.000	1.000

Table 10.   Career Designation Codes by Competitive Category

CD Code	Air	Air Ground	CSS	Ground	Law	Total
0	675	81	500	171	28	1,455
1	0	1	0	2	0	3
2	0	2	5	1	0	8
5	1	41	203	100	6	351
6	46	172	960	561	60	1,799
7	0	32	182	81	6	301
Total	722	329	1,850	916	100	3,917
% Missing CD Code	0.934903047	0.246200608	0.27027027	0.186681223	0.28	0.371458

c.   Honorable Discharge

This is a binary variable that takes on a value of 1, if the officer separates from the Marine Corps with an honorable discharge. The focus of Model 3 is the loss of high-quality individuals and the model isolates officers who were meritoriously designated or board selected. If an officer possesses any other separation code, or is missing a separation code, they receive a value of 0. We take an additional step to code this variable. As outlined in MCO 1001.65, "Officers eligible for CD who request not to be considered by the ORB, and officers selected for CD by the ORB who decline to accept an offer of CD, shall not be granted an administrative extension in order to receive additional CD opportunities" (2014, p.1–3). Officers possessing a CD Code of 7 decline career designation and will execute their EAS. Within the data, all officers who have separated with codes 7s and 2s depart with honorable discharges. For the purpose of this research, the remaining codes 7s are recorded as honorable discharges. This is to capture the eventual loss of code 7s. We display the summary statistics for Model 3 (see Table 11).

Table 11.   Summary Statistics Model 3

Variable	Obs	Mean	Std. Dev.	Min	Max
Hon Discharge	2062	0.177	0.382	0	1
Meritorious CD	2062	0.084	0.277	0	1
TBS Top 6%-15%	2062	0.105	0.307	0	1
TBS Top 16%-30%	2062	0.157	0.364	0	1
ORB Not top 30%	2062	0.654	0.476	0	1
USNA	2062	0.149	0.356	0	1
NROTC	2062	0.189	0.392	0	1
OCC	2062	0.166	0.372	0	1
ENL Prog	2062	0.165	0.372	0	1
PLC	2062	0.276	0.447	0	1
Other Prog	2062	0.015	0.122	0	1
GCT Score	2062	123.682	9.188	87	154
Beyond Bachelor	2062	0.044	0.205	0	1
PFT Avg	2062	274.118	23.986	72	300
CFT Avg	2062	293.313	18.247	60	300
Rifle Avg	2062	313.008	13.819	215	341
Pistol Avg	2062	328.018	26.535	235	386
Female	2062	0.096	0.295	0	1
Non White	2062	0.254	0.435	0	1
Married	2062	0.561	0.496	0	1
Ground	2062	0.312	0.463	0	1
CSS	2062	0.556	0.497	0	1
AirGround	2062	0.100	0.300	0	1
Law	2062	0.032	0.176	0	1
FY2010	2062	0.429	0.495	0	1
FY2011	2062	0.500	0.500	0	1
FY2012	2062	0.071	0.257	0	1
Years of Service	2062	3.921	3.891	0	18

2.   Independent Variables

We construct the independent variables using elements of both data sets. The independent variables fall into one of seven categories: commissioning source, demographics, FY cohort, measures of quality, performance, and career designation competitive category. The following tables represent the entire sample population. We explain the data source for each independent variable in the description.

a.   *Commissioning Source*

The commission source variable includes seven distinct categories. We code them in binary for one of the following programs: USNA, NROTC, OCC, PLC, Enlisted

Program, Other, and Reserve. The "Enl_Program" includes the three enlisted commissioning programs of MECEP, ECP, and MCP. The "Other" variable includes the two subsets of other program and transfer. We create these variables with the TBS data (see Table 12).

Table 12.   Commissioning Source Entire Sample

Commissioning Source	Observations	Frequency	Std. Dev.
USNA	3917	0.185	0.389
NROTC	3917	0.168	0.374
OCC	3917	0.157	0.364
PLC	3917	0.302	0.459
ENL Program	3917	0.127	0.333
Reserve	3917	0.040	0.196
Other Program	3917	0.020	0.141

b.   Demographics

Most of the demographic variables are self-explanatory. This subset includes variables that take on binary and continuous forms. The binary variables include race, marital status, gender and education beyond a bachelor's degree. We simplify the race variable into two categories of white and non-white. The two categories are formatted in this manner due to a lack of diversity in Model 1. Continuous variables include age at commissioning, and years of service. We calculate both variables using TFDW data. We derive Age at commissioning by subtracting the date of birth from the observation's commission date. Years of service is provided directly from the TFDW file (see Table 13).

Table 13.   Demographics Entire Sample

Demographics	Obs	Mean	Std. Dev.	Min	Max
Age at Commission	3917	24.313	2.777	19.655	38.937
Male	3917	0.910	0.286	0.000	1.000
Female	3917	0.090	0.286	0.000	1.000
White	3917	0.755	0.430	0.000	1.000
Non-White	3917	0.245	0.430	0.000	1.000
Married	3917	0.530	0.499	0.000	1.000

c.   FY Cohort

The cohorts begin in 2010, following the establishment of career designation and end in 2012. We could only extend to 2012 due to the requirement to capture an officer's decision point of exiting or continuing service. This variable is binary and is derived from an officer's commission date based on TFDW data and adjusted to match the fiscal year (see Table 14). The 2010 cohort is slightly underrepresented due to missing EDIPI numbers. The 2012 cohort is also underrepresented due to missing career designation codes.

Table 14.   FY Cohort Entire Sample

FY Cohort	Observations	Frequency	Std. Dev.
FY2010	3917	0.384	0.486
FY2011	3917	0.422	0.494
FY2012	3917	0.194	0.395

d.   Measures of Quality

We create seven binary variables to measure quality. These variables measure points in junior officers' careers where they were graded against their peers. Meritorious designation and board designated are mutually exclusive variables. The board designated population is further separated into percentages based on an officer's standing at TBS. To qualify as board selected, officers must receive a career designation code of 2, 6, or 7. Meritorious designation is the dependent variable in Model 1, and becomes an independent variable in Model 3. We use TBS thirds for independent variables in Model 2. The board selected TBS percentile variables are used as explanatory variables in Model 3b. The following paragraphs explain each variable.

Meritorious CD. This variable is equal to 1, if a given officer is meritoriously designated at TBS. This represents a student who graduated in the top 5 percent of his/her TBS class, and was subsequently awarded meritorious designation. This variable is excluded from Model 2 to measure the effects of the top third of TBS graduates who did not receive meritorious designation.

Board Select: TBS 6%–15%. This variable is equal to 1, if a given officer is selected by the ORB and graduated in the top 6–15 percentile of their TBS class.

Board Select: TBS 16%–30%. This variable is equal to 1, if a given officer is selected by the ORB and graduated in the top 16–30 percentile of their TBS class.

Board Select: TBS Not Top 30%. This variable is equal to 1, if a given officer is selected by the ORB and was not in the top 30 percentile of their TBS class. The summary table displays the restricted quality population. The Meritorious observations jump to 8 percent of the restricted population (see Table 15).

Table 15.   Model 3 Quality Measures

Variable	Obs	Mean	Std. Dev.
Meritorious CD	2062	0.084	0.277
TBS Top 6%-15%	2062	0.105	0.307
TBS Top 16%-30%	2062	0.157	0.364
ORB Not top 30%	2062	0.654	0.476

TBS_Top3rd. This variable is equal to 1, if officers graduate in the top third of their TBS class. As previously described, this variable will become mutually exclusive from the meritorious designation variable in Model 2.

TBS_Mid3rd. This variable is equal to 1, if officers graduate in the middle third of their TBS class.

TBS_Bot3rd. This variable is equal to 1, if officers graduate in the bottom third of their TBS class. The entire sample population is represented in the summary table (see Table 16).

Table 16.   TBS Thirds Summary Statistics Entire Sample

Variable	Observations	Mean	Std. Dev.
Top3rd	3917	0.336	0.472
Middle3rd	3917	0.335	0.472
Bottom3rd	3917	0.329	0.470

e.   *Performance Measures*

Performance measures are taken over the span of a junior officer's career. There are five continuous variables that include PFT average, CFT average, Rifle average Pistol average and GCT Score. The first four are annual events that each officer is required to complete. We take the average to capture the total picture of sustained performance, rather than a single high or low.

PFT Avg. The Physical fitness test is an annual requirement used to measure the general fitness of each Marine. The test is taken between 1 January and 30 June of each year. Males and females both complete a timed three mile run and the maximum amount of abdominal crunches in two minutes. To test upper body strength, males complete dead hang pullups, while females complete the flexed arm hang. This is a continuous variable created by taking the average score of each observations performance on the annual test. The maximum attainable score is 300 points (MCO 6100.13, 2010).

CFT Avg. The Combat Fitness test is an annual requirement that measure the strength stamina, agility and coordination. The test is taken between 1 July and 31 December of each year and scored on a 300 point scale (see Table 17). Males and females complete 3 events: Movement to contact, Ammunition lift, and Maneuver under fire. We create this continuous variable by averaging the scores of each officer's performance on the annual test. The maximum attainable score is 300 points (MCO 6100.13, 2010).

Table 17.   Combat Fitness Test Classifications

CFT Classifications	
1st Class	270-300
2nd Class	225-269
3rd Class	190-224
Fail	189 and below

Adapted from: Headquarters Marine Corps. (2008, August 1). Marine Corps physical fitness program (Marine Corps Order P6100.13). Washington, DC: Author.

Pistol_Avg. Pistol qualification is a fiscal year requirement for each officer. A shooter may receive one of four qualifications (see Table 18). This is a continuous variable based on the average of each officer's recorded scores.

Table 18.   Pistol Qualifications

Unqualified	Marksman	Sharpshooter	Expert
0-263	264-323	324-363	364-400

Adapted from: Headquarters Marine Corps. (2007, August 1). *Marine Corps combat marksmanship program* (Marine Corps Order 3574.2K). Washington, DC: Author.

Rifle_Avg. Rifle qualification is a fiscal year requirement for each officer. A shooter may receive one of four scores (see Table 19). This is a continuous variable based on the average of each Marine's recorded score (MCO 3574.2L). The performance measures are displayed for the entire sample (see Table 20)

Table 19.   Rifle Qualifications

Unqualified	Marksman	Sharpshooter	Expert
0-249	250-279	280-304	305-350

Adapted from: Headquarters Marine Corps. (2007, August 1). Marine Corps combat marksmanship program (Marine Corps Order 3574.2K). Washington, DC: Author.

Table 20.   Performance Measures Summary Statistics Entire Sample

Variable	Observations	Mean	Std. Dev.	Min	Max
PFT Avg Score	3917	271.815	25.708	63	300
CFT Avg Score	3917	292.298	19.713	60	300
Rifle Avg Score	3917	311.995	14.939	200	345
Pistol Avg Score	3917	326.747	28.333	235	397
Beyond Bachelor	3917	0.038	0.191	0	1

GCT Score. The general classification test (GCT) is administered to all commissioned and warrant officers at TBS. The maximum attainable score is 160 and retakes are not authorized (MCO 1230.5C). This is a continuous variable and is recorded once while an officer attends TBS. The GCT scores are displayed for the entire sample (see Table 21).

Table 21.   GCT Scores Entire Sample

Variable	Observations	Mean	Std. Dev.	Min	Max
GCT Score	3917	124.257	9.330	80	154

f.   Career designation Competitive Category

The Marine officer population is divided into five competitive categories based on their assigned MOS. As explained by Captain McNeil, USMC retention and release officer, "The number of officers selected is determined by the retention percentage for each category…The precept does not state that a certain amount of officers per each MOS must be retained" (2013, slide 8). This is a binary variable and each officer is assigned to one of the five categories based on the MOS recorded in the TFDW data. The competitive categories and sample summary statistics are displayed (see Table 22 and Figure 2).

Table 22.   Competitive Category Entire Sample

Variable	Observations	Mean	Std. Dev.	Min	Max
Ground	3917	0.234	0.423	0	1
CSS	3917	0.472	0.499	0	1
Air-Ground	3917	0.084	0.277	0	1
Air	3917	0.184	0.388	0	1
Law	3917	0.026	0.158	0	1

Figure 2.   Career Designation Competitive Categories
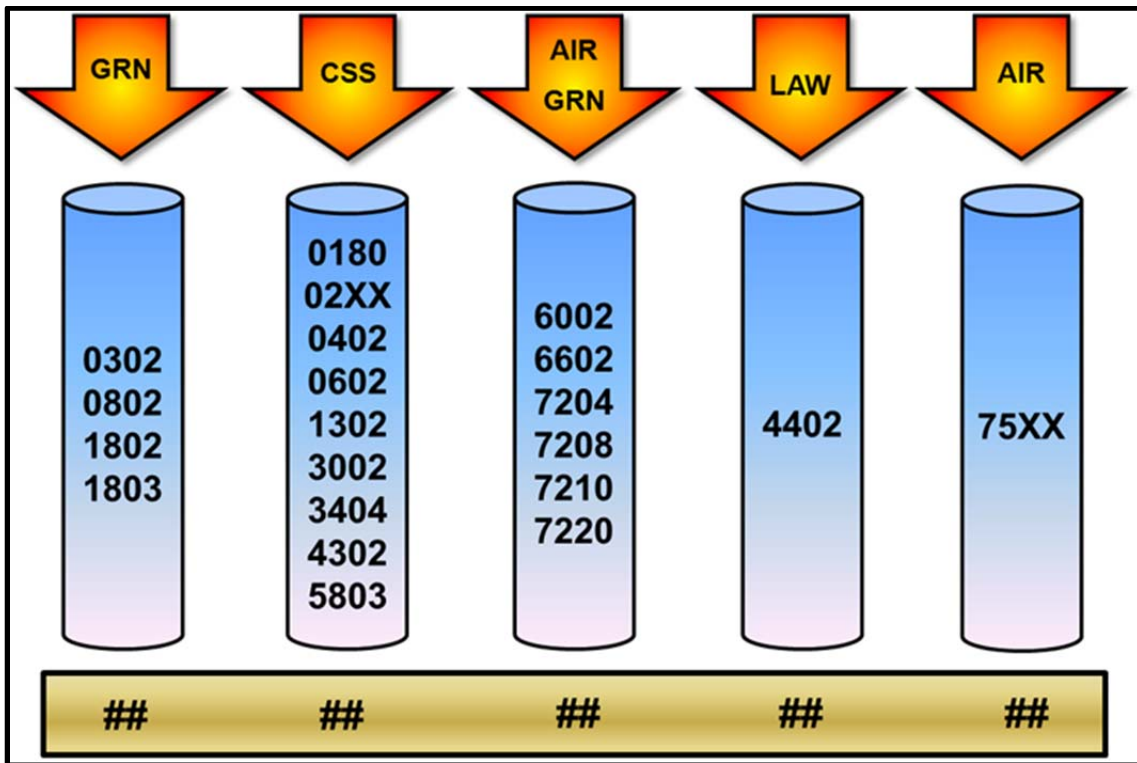
E.   **CHAPTER SUMMARY**

This chapter describes the data retrieved from TFDW and TBS. We introduce three models, and present summary statistics for the entire sample population. Each model focuses on a specific subset of the total sample. Model 1 includes the entire population in order to determine entry factors that are significant to meritorious designation upon graduation from TBS. Model 2 focuses on the members of the sample that had the opportunity to be vetted by the ORB and receive a designation code. The inclusion of the TBS class thirds will enhance the model by carrying forward entry level measures of quality. Models 3a and 3b isolate only high-quality individuals who are given the opportunity to remain in the Marine Corps through one of the designation programs. Model 3b includes dummy variables for the top 30 percent of TBS graduates.

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V.   RESULTS

A.   OVERVIEW

We explain the results of each model and describe the base officer for comparison. The results are presented in tables and we discuss the significant independent variables of each category.

B.   MODEL 1: ENTRY LEVEL FACTORS SIGNIFICANT TO MERITORIOUS DESIGNATION AT TBS

Model 1 uses entry level demographics and commissioning programs to identify significant factors in receiving meritorious designation at TBS. The dependent variable for this model is meritorious designation. The creation of this variable was explained in Chapter IV and included data from TFDW and TBS. If a given officer receives meritorious designation the binary variable takes on the value of 1.

The independent variables for this model includes commissioning source, GCT score, age at commissioning, gender, race, marital status and FY cohort. We do not include the performance variables from TFDW because the majority were recorded post TBS. Model 1 is unrestricted and utilizes the entire sample population. We describe the base student officer for Model 1 in Table 23.

Table 23.   Model 1 Base Officer

Model 1
PLC commissioning program
Male
White
Single
Commissioned FY 2010

The results for Model 1 are displayed in Table 24. Each model is presented in the same fashion. Column 1 is the explanatory variables included in the model specification. Column 2 is the coefficient marginal effects for each of the variables listed in column 1. Column 3 presents the standard errors in parentheses. The r-squared value for this model is 0.134; this informs us that the model explains 13.4 percent of the variation in the data. This implies that there are likely multiple factors that contribute to meritorious designation that are not captured in the data.

Table 24.   Results Model 1: Meritorious Designation

Model 1 Variables	Meritorious CD = 1 Marginal Effects	Standard Error
USNA	0.009	(0.010)
NROTC	0.016	(0.010)
OCC	0.006	(0.010)
ENL Prog	0.084***	(0.027)
Other (OT)	0.030	(0.029)
Reserve	0.008	(0.017)
GCT Score	0.003***	(0.000)
Age at Commission	0.000	(0.001)
Female	-0.033***	(0.004)
Non_White	-0.018***	(0.005)
Married	0.003	(0.005)
FY 2011	-0.000	(0.006)
FY 2012	-0.006	(0.007)
Observations	3,917	
Pseudo R-Squared	0.1341	
Standard Errors in Brackets		
*** p<0.01, ** p<0.05, * p<0.1		

a.   *Commissioning Source Results*

Five of the six commissioning source programs are insignificant at the 10 percent level of significance. The exception is the enlisted commissioning program, which is significant at the 1 percent level. The 0.084 marginal effects coefficient means that on average, holding all else constant, an officer who is commissioned through an enlisted commissioning program increases his/her probability of meritorious designation by 8.4 percent, when compared to an officer who commissioned through the PLC program.

b.   *Performance Measures*

The performance measures in Model 1 are limited to the recorded GCT score. The GCT score is significant at the 1 percent level. The 0.003 marginal effects means that on average, holding all else constant, each additional point a student officer scores on the GCT increases his/her probability of meritorious designation by 0.3 percent. We use scores from the sample population to explain this effect. The top score in the sample is 154, the sample mean is 123. This difference represents a 9.3 percent increase in the probability of receiving meritorious designation.

c.   *Demographics*

The demographics variables in Model 1 includes age at commissioning, gender, race (white and non-white), and marital status. Age at commissioning, and marital status prove to be insignificant at the 10 percent level of significance, and gender and race are significant at the 1 percent level. The -0.033 marginal effects coefficient for female means that on average, holding all else constant, female officers are 3.3 percent less likely than male officers to receive meritorious designation. The non-white variable has a marginal effects coefficient of -0.018; meaning that, holding all else constant, non-white officers have a 1.8 percent lower probability than white officers of receiving meritorious designation.

When we compare TBS grade point averages of the sample in academics, military skills and leadership skills, on average, males perform higher in all three categories. The same result is found between the white and non-white variables (see Table 25). This could serve to explain the negative coefficients associated with these two demographic groups.

Table 25.   Mean TBS GPA by Demographic Variable

	GPA	Mean	Std. Dev.	Min	Max
Male	Leadership GPA	85.46	5.67	74.71	98.66
	Mil Skills GPA	86.01	4.19	69.41	97.58
	AcademicsGPA	86.81	4.22	70.98	98.54
Female	Leadership GPA	82.55	5.30	74.70	96.26
	Mil Skills GPA	84.46	3.80	74.70	92.98
	AcademicsGPA	84.33	4.38	74.76	95.72
White	Leadership GPA	85.52	5.72	74.71	98.66
	Mil Skills GPA	86.10	4.19	69.41	97.58
	AcademicsGPA	86.90	4.23	73.65	98.54
Non-White	Leadership GPA	84.23	5.52	74.70	98.03
	Mil Skills GPA	85.15	4.08	75.09	97.08
	AcademicsGPA	85.63	4.37	70.98	97.43

C.   MODEL 2: ORB RESULTS

The purpose of Model 2 is to determine factors significant to a junior officer's selection to career designation by the ORB. Officers who receive meritorious designation at TBS are removed from the sample population. We remove the Air competitive category and officers missing career designation codes from the model. The remaining officers record designation codes of 1, 2, 5, 6, or 7. This isolation allows the researchers to view only officers who were vetted by the ORB.

The independent variables for this model includes the graduating thirds from TBS, commissioning source, GCT score, beyond bachelor's degree, rifle average score, pistol average score, CFT average score, PFT average score, years of service, gender, race, marital status, career designation competitive category and FY cohort. Model 2b removes years of service to determine if the marginal coefficient of the enlisted commissioning program increases in magnitude. The base officer for Model 2 is explained (see Table 26).

Table 26.   Base Officer Model 2

Model 2
Bottom Third TBS Graduate
PLC Program
Bachelor's Degree
Male
White
Single
Combat Service Support
Commissioned FY 2010

The results for Model 2 are displayed in Table 27. The r-squared value for these models is 0.117 and 0.115 respectively; this informs us that the models explain 11.7 and 11.5 percent of the variation that determines selection by the ORB.

Table 27.   Results Model 2 Selection by the ORB

Model 2	ORB Selected CD = 1			
	2A		2B	
Variables	Marginal Effects	Std. Error	Marginal Effects	Std. Error
Top TBS 3rd	0.108***	(0.016)	0.109***	(0.016)
Middle TBS 3rd	0.066***	(0.015)	0.066***	(0.015)
USNA	0.057***	(0.020)	0.046**	(0.021)
NROTC	0.023	(0.020)	0.009	(0.019)
OCC	-0.031	(0.027)	-0.045*	(0.027)
ENL Program	0.032	(0.035)	0.071***	(0.020)
Reserve	-0.010	(0.036)	-0.022	(0.037)
Other (OT)	0.054	(0.044)	0.064	(0.039)
GCT Score	-0.001*	(0.001)	-0.001*	(0.001)
Beyond Bachelors Degree	-0.016	(0.048)	-0.017	(0.048)
PFT Avg Score	0.001***	(0.000)	0.001***	(0.000)
CFT Avg Score	0.000	(0.000)	0.000	(0.000)
Rifle Avg Score	-0.000	(0.001)	-0.000	(0.001)
Pistol Avg Score	0.001***	(0.000)	0.001***	(0.000)
Female	0.114***	(0.013)	0.114***	(0.013)
Non-White	0.038**	(0.016)	0.039**	(0.016)
Married	0.055***	(0.015)	0.058***	(0.015)
Ground	0.013	(0.016)	0.011	(0.016)
Air Ground	-0.017	(0.026)	-0.018	(0.026)
Law	0.108***	(0.017)	0.104***	(0.019)
FY 2011	0.097***	(0.016)	0.091***	(0.016)
FY 2012	0.090***	(0.020)	0.085***	(0.021)
Years of Service	0.007*	(0.004)		
Observations	2,242		2,242	
Pseudo R-Squared	0.117		0.115	
Standard Errors in Brackets				
*** p<0.01, ** p<0.05, * p<0.1				

1. TBS Thirds: Early measures of quality

The Top and middle third graduates from TBS both prove to be positive and significant at the 1 percent level in predicting selection by the ORB. Their magnitude does not change when years of service is dropped. The positive marginal effects coefficients of 0.108 and 0.066 mean that on average, holding all else constant, the top and middle thirds graduates have a 10.8 percent and 6.6 percent higher probability of selection by the ORB than the officers who graduated in the bottom third of their TBS class.

2. Commissioning Source Results

Five of the six commissioning source programs are insignificant at the 10 percent level in Model 2a. The exception is the USNA variable. The USNA commissioning program is positive and significant at the 1 percent level with a marginal effects coefficient of 0.057. This means that on average, holding all else constant officers commissioned through the USNA program have a 5.7 percent higher probability of being selected by the ORB than officers who commissioned through the PLC program.

When the years of service variable is dropped from Model 2b, the marginal effects coefficient of USNA reduces to 0.046 and the enlisted program becomes significant at the 1 percent level of significance. The marginal coefficient on the enlisted program is 0.071. Meaning that on average, holding all else constant officers commissioned through an enlisted commissioning program have a 7.1 percent higher probability of selection by the ORB than officers who commissioned through the PLC program. The OCC program becomes negative and significant at the 5 percent level with a marginal coefficient of 0.451 under these conditions.

3. Performance Measures

Three of the six performance measures are significant at the 10 percent level of significance. The GCT score is negative and significant at the 10 percent level with a marginal effects coefficient of -0.001. This means that on average, holding all else constant, each additional point a student officer receives on the GCT score decreases their

probability of selection by the ORB 0.1 percent. Scores from the sample population will used to explain this effect. The top score in the sample is 154, the sample mean is 123. This difference represents a 3.1 percent reduction in the probability of selection by the ORB.

The PFT and pistol average were positive and significant at the 1 percent level, with marginal coefficients of 0.0012 and 0.001 respectively. For each additional point officer's score on their average PFT and pistol scores, they increase their probability of selection by 0.1 percent. To provide scale, officers under the age of 27 must score between 225 and 300 points to receive a 1st class PFT. The difference between a high and low first class can represent up to 9.0 percent toward an officer's probability of board designation. Similarly, the difference between the pistol mean of 325 vice the highest recorded score of 386 in the sample can improve an officer's probability of selection by 6.1 percent. The magnitude of the marginal coefficients remains largely unchanged in Model 2b but their significance remains.

4.   Demographics

Each of the demographics variables is positive and significant to at least the 10 percent level of significance. The Years of service, continuous variable, is significant at the 10 percent, non-white at the 5 percent, and marital status and female were significant at the 1 percent level of significance. We explain the effects of the demographic variables holding all else constant.

The Years of service variable has a marginal coefficient of 0.007, for each additional year of service an officer records, they increase their chances of selection by the ORB by 0.7 percent. The years of service variable is dropped from Model 2b.

The non-white variable has a marginal coefficient of 0.038. On average, non-white officers have a 3.8 percent increased probability of selection when compared to white officers. The marginal coefficient increases to 0.039 in Model 2b.

The female variable has a marginal coefficient of 0.114. On average, female officers have an 11.4 percent increased probability of selection when compared to male officers. The marginal coefficient remains unchanged in Model 2b.

The marriage variable has a marginal coefficient of 0.055. On average, married officers have a 5.5 percent increased probability when compared to single officers. The marginal coefficient increases to 0.057 in Model 2b.

5.   Career Designation Competitive Category

The four remaining competitive categories, Ground, Air-Ground, CSS and Law, are statistically insignificant with the exception of Law. As displayed in Table 1, the Law competitive category maintains a higher selection rate from the ORB since the establishment of competitive career designation in 2010. The Law competitive category is positive and significant at the 1 percent level and has a marginal coefficient of 0.108, when compared to officers of the CSS category; they are 10.8 percent more probable of being selected by the ORB. This confirms what would be expected given the historical results of the ORB.

6.   Fiscal Year Cohort

The FY cohort years prove to be significant at the 1 percent level. As Table 1 displays, the ORB grew more competitive from FY 2010 ORB 1 through FY 14 ORB 1, traversing from 85 percent selected to 55 percent across Ground, CSS and Air-Ground categories. Given the required observed fitness report times, officers who commissioned in 2010 would logically be reaching the ORB during the most competitive historical periods. Commissioning in FY 2011 and FY 2012 are positive and significant with marginal coefficients of 0.097 and 0.090 respectively. Officers who commissioned in FY 2011 and FY 2012 are 9.7 percent and 9.0 percent more likely to be selected by the ORB than officers who commissioned in 2010. The marginal coefficients were slightly reduced in Model 2b.

D.   MODEL 3: DEPARTURE OF SERVICE

The purpose of Model 3 is to answer the primary question and determine factors significant to a high-quality junior officer's departure from the Marine Corps. The sample is restricted to officers who received meritorious designation at TBS, and officers who were offered designation. We exclude the Air competitive category and officers who receive a career designation code other than 2, 6 or 7 from the model. The dependent variable is honorable discharge and is equal to 1 if an officer exits the Marine Corps with an honorable discharge. If an officer received any other separation, they are dropped from the model, as the purpose of this research is to identify the loss of high-quality individuals that the Marine Corps would have desired to retain.

We include two variations of Model 3. The first variation focuses on the significance of the designation source. The explanatory variables include board designation and meritorious designation. Model 3b separates the population further by their standing at TBS.

The independent variables for this model are similar to Model 2 and include: meritorious designation, board designation, commissioning source, GCT score, beyond bachelor's degree, rifle average score, pistol average score, CFT average score, PFT average score, years of service, gender, race, marital status, competitive category and FY commissioning cohort. Model 3b further separates ORB selected officers by their TBS graduating percentiles. We describe the base officer for each model (see Table 28).

Table 28.   Base Officer Model 3a and 3b

Model 3a	Model 3b
ORB Selected Officer	ORB Selected Officer, Not TBS Top30% Grad
PLC Program	PLC Program
Bachelor's Degree	Bachelor's Degree
Male	Male
White	White
Single	Single
Combat Service Support	Combat Service Support
Commissioned FY 2010	Commissioned FY 2010

The results for Model 3a and 3b are displayed in Table 28. The r-squared values for the models are 0.09 and 0.095; this informs us that the model explains 9.0 and 9.5 percent of the variation in the data.

Table 29.   Results Model 3a and 3b, High-Quality Exit

Model 3	Leave Service: Hon Discharge=1				
Variables	**3A**		**Variables**	**3B**	
	Marginal Effects	**Std Error**		**Marginal Effects**	**Std Error**
Meritorious CD = 1	0.046	(0.036)	Meritorious CD = 1	0.076*	(0.040)
			Top_ 6-15%	0.093***	(0.034)
			Top_16-30%	0.034	(0.025)
USNA	-0.061***	(0.022)	USNA	-0.060***	(0.022)
NROTC	-0.014	(0.024)	NROTC	-0.013	(0.023)
OCC	0.026	(0.029)	OCC	0.023	(0.029)
ENL_Prog	-0.103***	(0.031)	ENL_Prog	-0.109***	(0.030)
Reserve	-0.058*	(0.033)	Reserve	-0.055*	(0.033)
Other (OT)	-0.082*	(0.045)	Other (OT)	-0.082*	(0.044)
GCT Score	0.003***	(0.001)	GCT Score	0.003***	(0.001)
Beyond Bachelors Degree	-0.043	(0.037)	Beyond Bachelors Degree	-0.039	(0.038)
PFT_Avg_Score	-0.000	(0.000)	PFT_Avg_Score	-0.000	(0.000)
CFT_Avg_Score	-0.000	(0.000)	CFT_Avg_Score	-0.000	(0.000)
Rifle_Avg_Score	0.001	(0.001)	Rifle_Avg_Score	0.001	(0.001)
Pistol_Avg_Score	-0.001**	(0.000)	Pistol_Avg_Score	-0.001***	(0.000)
Female	-0.028	(0.026)	Female	-0.027	(0.026)
Non_White	-0.001	(0.020)	Non_White	0.004	(0.020)
Married	-0.093***	(0.017)	Married	-0.095***	(0.017)
Ground	-0.039**	(0.017)	Ground	-0.044***	(0.017)
Air Ground	0.054*	(0.032)	Air Ground	0.058*	(0.033)
Law	-0.065*	(0.036)	Law	-0.067*	(0.035)
FY 2011	-0.043**	(0.018)	FY 2011	-0.039**	(0.018)
FY 2012	-0.074***	(0.026)	FY 2012	-0.072***	(0.027)
Years of Service	-0.014***	(0.005)	Years of Service	-0.014***	(0.005)
Observations	2,062		Observations	2,062	
Pseudo R-Squared	0.090			0.095	
Standard Errors in Parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

1.   Designation Source

The source of designation is not significant in Model 3a. This serves to answer the question of the impact of designation source on an officer's decision to leave the Marine Corps. When we isolate the high-quality individuals, being designated through TBS or through the ORB, the source is not statistically significant to the decision to exit the Marine Corps.

When we further separate the population offered career designation in Model 3b, meritorious designation and the top 6–15 percentile TBS graduates become statistically significant at the 10 and 1 percent level of significance. When compared to board designated individuals that did not graduate in the top 30 percent of their TBS classes, holding all else constant, these two groups are 7.6 percent and 9.3 percent more probable to exit the service.

2.   Commissioning Source

Four of the six commissioning source programs are insignificant at the 10 percent level of significance. The USNA and Enlisted commissioning programs are both negative and significant at the 1 percent level of significance. An officer who commissions through one of the two programs has a reduced probability of exiting the Marine Corps. The marginal coefficients for the enlisted commissioning program are -0.10, and the USNA is -0.06. This means that on average, holding all else constant officers who commissioned through one of these programs have a 10.0 percent and 6.0 percent lower probability of departing the Marine Corps than an officer who commissioned through the PLC program. The changes to the marginal coefficients and levels of significance were minimal in Model 3b.

3.   Performance Measures

The GCT score and pistol score average are statistically significant to an officer's decision to leave the Marine Corps. The GCT score is positive and significant at the 1 percent level of significance with a marginal coefficient of 0.003. This means that on average, holding all else constant, each additional point student officers receive on the GCT increases their probability of exiting the Marine Corps by 0.3 percent. Scores from the sample population will be used to demonstrate this effect. The top score in the sample is 154, the sample mean is 123. This difference represents a 9.3 percent increase in the probability of exiting the Marine Corps after being offered career designation. The marginal coefficient in Model 3b is the same and the significance is unchanged.

The pistol average is negative and significant at the 5 percent level of significance with a marginal coefficient of -0.001. Each additional point an officer scores on their

overall pistol average reduces the probability of exiting by 0.1 percent. The difference between the mean pistol average score of 328 vice the highest recorded score of 386 in the sample can reduce an officer's probability of exit by 5.8 percent.

4. Demographics

Gender and race were not significant to Model 3. Years of service and marital status were both negative and significant at the 1 percent level of significance. The marriage variable has a marginal coefficient of -0.092, on average, holding all else constant, married officers are 9.2 percent less probable to exit the service than single officers.

The probability of exiting the Marine Corps after the first term reduces as years of service increase. The marginal coefficient of years of service is -0.014. This means that each additional year of service reduces the probability of exiting the Corps by 1.4 percent. This variable behaved as expected considering the sample population. Junior officers who are heavily invested with time in service would be less likely to exit.

5. Competitive Category

The career designation competitive categories were significant at the 10 percent level of significance. The ground competitive category is negative and significant at the 5 percent level of significance with a marginal coefficient of -0.039. This means that on average, holding all else constant, ground officers are 3.9 percent less probable to exit the service than combat service support officers. The Air-Ground category is positive and significant at the 10 percent level of significance with a marginal coefficient of 0.054. This means that on average, holding all else constant, Air-Ground officers are 5.4 percent more probable to exit the service than combat service support officers. The Law category is significant and negative at the 10 percent level with a marginal coefficient of -0.065. Model 3b did not change the significance of the competitive categories.

6. Fiscal Year Cohort

The FY cohorts were negative and significant at the 5 and 1 percent level of significance. The marginal coefficients for FY 2011 and FY 2012 are -0.042 and

-0.074, respectively. This means that, on average, holding all else constant, officers who commissioned in FY 2011 and FY 2012 are 4.2 percent and 7.4 percent less likely to leave the service after the offer of designation than officers who commissioned in 2010.

7. Quality Remaining versus Quality Exiting

We are now able to analyze the varying levels of high-quality junior officers who remain and those who exit the Marine Corps. The officers who are afforded the opportunity to continue service are separated into the established quality categories: Meritoriously designated, top 6–15 percent at TBS, top 16–30 percent at TBS, and remaining officers selected by the ORB. We calculate the performance means for each category separated by departure behavior (see Table 30). The performance means encompass the recorded events through an officer's first obligation.

Table 30.   Officers Offered Career Designation: Continue Versus Exit

Measures of Performance	Obs	GCT Score	PFT_Avg	CFT_Avg	Rifle_Avg	Pistol_Avg
Performance Means of Officers Offered Career Designation						
Meritorious CD Total	173	131.3	281.3	296.2	319.8	339.9
TBS Top 6%-15% Total	217	127.5	279.6	296.7	317.4	336.9
TBS Top 16%-30% Total	323	124.6	278.9	295.1	316.1	333.7
Remaining ORB Select Total	1349	121.9	271.1	292.0	310.7	323.7
Performance Means of Officers Who Continue Service						
Meritorious CD Continue	141	130.9	280.7	295.7	320.9	342.4
TBS Top 6%-15% Continue	167	126.9	278.2	296.4	317.4	337.7
TBS Top 16%-30% Continue	265	124.4	278.4	294.4	316.6	334.5
ORB Select Not Top 30% TBS Continue	1124	121.6	271.4	292.4	310.8	324.6
Remain Average Scores	N/A	126.0	277.2	294.7	316.4	334.8
Performance Means of Officers Offered Career Designation Who Exit Service						
Meritorious CD Exit	32	133.0	283.9	298.2	314.9	329.1
TBS Top 6%-15% Exit	50	129.4	284.3	297.8	317.5	334.3
TBS Top 16%-30% Exit	58	125.7	281.4	297.8	313.9	330.0
ORB Select Not Top 30% TBS Exit	225	123.0	270.1	290.0	310.1	319.3
Exit Average Scores	N/A	127.8	279.9	295.9	314.1	328.2

In most cases the performance means behave as expected in relation to a junior officer's performance at TBS. The meritoriously designated officers' record the highest average scores through their initial obligation. This trend continues as the TBS rankings move further from the top 5 percent. Officers who were not in the top 30 percent of their

class but were selected by the ORB record the lowest average scores; this also represents the largest sub-population. The highest average score for the categories of quality are highlighted in green and the lowest in red.

The second tier of quality through the lens of TBS rankings experiences the highest exit rates at 23 percent. The meritoriously designated officers exit service at the next highest rate of 18.5 percent (see Table 31).

Table 31.   Exit Rates by Quality Category

Officers Offered CD	Obs	Percent of Sample by Category
Total Sample	2062	100.0%
Meritorious CD Total	173	8.4%
TBS Top 6%-15% Total	217	10.5%
TBS Top 16%-30% Total	323	15.7%
ORB Select Not TBS Top 30%	1349	65.4%
Continue Service	Obs	Percent Continue by Category
Total Continue	1697	82.3%
Meritorious CD Continue	141	81.5%
TBS Top 6%-15% Continue	167	77.0%
TBS Top 16%-30% Continue	265	82.0%
ORB Select Not TBS Top 30%	1124	83.3%
Exit Service	Obs	Percent Exit by Category
Total Exit	365	17.7%
Meritorious CD Exit	32	18.5%
TBS Top 6%-15% Exit	50	23.0%
TBS Top 16%-30% Exit	58	18.0%
ORB Select Not TBS Top 30%	225	16.7%

E.   CHAPTER SUMMARY

In this chapter, we present the results of our three probit models used to answer the primary and secondary research questions. Each of the models focuses on varying levels of quality within the junior officer population from 2010 to 2012. Model 1 uses the entire sample population to determine factors significant to meritorious designation. Model 2 removes the meritoriously designated officers from the population and focuses on the results of the ORB using the sample population who were offered career designation. Model 3 isolates the officers who the Marine Corps desired to retain through one of the career designation programs. We then analyzed significant factors and officer departure behavior. Tables 24 through 29 displayed the results of the models and the

significance of each variable. Table 30 and 31 compares the performance means of officers who continue service against officers who exit. Chapter VI concludes by summarizing the major findings as they apply to the primary and secondary questions.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

We conclude that the Marine Corps is not bleeding talent, but talent it is seeping from the highest quality junior officer populations. The top two levels of quality, based on TBS standing and the results ORB, are more likely to exit the service than their peers who did not graduate in the top 30 percent. This chapter provides the findings and recommendations derived from the results of the models used during this research.

B. WHAT FACTORS ARE SIGNIFICANT TO A CAREER-DESIGNATED OFFICER'S DECISION TO LEAVE THE MARINE CORPS?

1. Conclusion

When we isolate officers who were offered career designation, we find that officers who were on the margin of receiving meritorious designation have the highest probability of exiting the Marine Corps. This observation is significant at the 1 percent level of significance.

Officers who commission through the USNA and enlisted commissioning programs are less likely to exit the Marine Corps. The enlisted commissioning program variable has the largest negative coefficient concerning the decision to leave. The USNA and enlisted programs more likely attract officers with a career mindset due to their experiences prior to commissioning. The more years of service officers have, the more probable it is they will continue to serve. The year of service variable behaved as expected and moves in the same direction as the enlisted commission programs. On average, single officers are more likely to exit the service following their initial obligation.

Model 3a and 3b provide the results for the primary research question. We find that the higher an officer's GCT score, the more likely he/she is to exit the Marine Corps. The GCT factor is significant in all three models, but the magnitude remains small in the decision to exit at 0.03 percent for every additional point scored on the test.

Officers selected by the ORB who were not in the top 30 percent of their TBS class exit service at the lowest rate of 16.7 percent. When we isolate officers who were able to continue following the ORB, 17.7 percent of the sample chooses to leave the service.

2. Recommendation

We recommend that the Marine Corps continues to implement an aggressive approach to the enlisted commissioning programs. The Marine Corps already maintains the highest ratio of prior enlisted officers when compared to the other services (Population Representation in the Military Services, 2013). These programs prove to be significant to meritorious designation and retention in the junior officer population. Due to the departure behavior of the 6–15 percent of TBS graduates, we recommend to expand the meritorious designation program. The details of this expansion are addressed in the following recommendations.

C. HOW DO MEASURES OF PERFORMANCE COMPARE BETWEEN THE HIGH-QUALITY OFFICERS WHO REMAIN IN SERVICE, AGAINST THOSE WHO LEAVE?

1. Conclusion

The highest recorded GCT, PFT, and CFT averages are found in the top 15 percent of TBS graduates, and of that specific population, the officers who exit record higher scores. The same observation is found with the subsequent levels of quality. The highest rifle and pistol averages are found in the meritoriously designated officers who to continue service.

When we analyze the different categories of quality against those who exit and those who continue service, we find that the highest percentage of loss per category is in the top two early predictors of quality: meritorious designation and TBS top 6–15 percent. These two sub-populations exit the service at 18.5 percent and 23.0 percent respectively. This loss equates to 3.98 percent of the officers the Marine Corps desired to retain.

2. Recommendations

We recommend that the Marine Corps expands the meritorious designation program to the top 10 percent of TBS graduates. The current program is successful in identifying high-quality officers as table 30 displays. This research finds that the next tier of quality, representing the top 6–15 percent of TBS graduates, departs the Marine Corps at a higher rate than meritoriously designated officers. This could be due to a hidden loyalty factor that is established by being awarded designation early in one's career.

Talented junior officers who are awaiting the results of the ORB may begin pursuing other career options as their EAS approaches and a level of uncertainty exist. Expanding the meritorious designation program to the top 10 percent of graduates could assist in capturing and retaining a higher proportion of talented junior officers.

D. IS THE SOURCE OF CAREER DESIGNATION, MERITORIOUS OR BOARD, SIGNIFICANT IN A JUNIOR OFFICER'S DECISION TO EXIT THE SERVICE?

1. Conclusion

We find that when we focus on the ORB designated and meritorious designated officers, the source of designation is not statistically significant to an officers decision the exit the Marine Corps.

When we further separate the officers who were offered career designation into TBS graduating percentile categories, we find that the top 5 percent and 6–15 percent of graduates are more likely to exit service than officers who were not in the top 30 percent of their class. These results were significant at the 10 and 1 percent levels of significance.

2. Recommendation

We recommend conducting further research through exit surveys on the top 15 percent of TBS graduates. This may determine if meritorious designation would have improved their probability of continuing service.

E. WHAT ENTRY LEVEL VARIABLES ARE SIGNIFICANT TO AN OFFICER RECEIVING MERITORIOUS DESIGNATION?

1. Conclusion

Model 1 provides the results to this question. Four factors are significant in this model. The enlisted commission program is the most significant program, with largest positive coefficient in earning meritorious designation. The GCT score is also positive and significant at the 1 percent significance level. This result reinforces the GCT score as a proxy of intelligence. The magnitude of the marginal coefficient is nearly identical with the opposite sign in the decision to exit.

The female and non-white demographic variables are negative and significant. This results in reducing the probability of receiving meritorious designation. When we compare the TBS grade point averages within the sample for academics, military skills and leadership skills, on average, males perform higher in all three categories. The same result is found between the white and non-white factors. This serves to explain the negative probability associated with these two demographic groups.

2. Recommendation

As previously recommended, the Marine Corps should continue their aggressive approach to the enlisted commissioning programs due to the results of this research. The Marine Corps is preparing for the full gender integration and is currently conducting research. Recommending gender and race policy changes is beyond the scope of this research.

F. IS TBS CLASS THIRD SIGNIFICANT IN PREDICTING SELECTION FOR THE ORB?

1. Conclusion

We find that the TBS graduating third is significant to his/her selection by the ORB. Graduating in the middle and bottom third of a given TBS class reduces the probability of selection by the ORB when compared to the top third of the class. The early predictors of quality through the lens of TBS prove to carry through an officer's

initial obligation. The top 15 percent of TBS graduates maintained the highest performance averages over their initial obligation.

2. Recommendation

We recommend that TBS continues the current evaluation process. The models used in this study reinforce that TBS is extremely proficient at measuring and ranking quality in entry level Marine Corps officers. Each measure of quality from the top 5 percent, to the ORB designated that were not in the top 30 percent of their class, demonstrates that an officer's TBS class standing is directly reflected in his/her performance during the first obligation of service.

G. FURTHER RESEARCH

This study has a narrow focus on the junior officer population. Further research should be conducted to the rank of Major. Although the enlisted commissioning programs prove significant in every model of this study, the same significance may not be held on a longer timeline due to reaching retirement eligibility. The same can be said for the TBS rankings. Evaluating how long TBS performance echoes to the later stages of an officer's career could further reinforce the evaluation process.

The inclusion of fitness report data in a similar study would be of value. Investigating the difference between the top 5, 10 and 15 percent of TBS graduates would help to determine if a loyalty factor exist with the meritoriously designated officers.

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